DARPA XS-1

MSS XEPHYR

Commercial Space Transportation Advisory Committee (COMSTAC)

Systems Working Group

Masten Space Systems Inc.

September 16, 2014

History

- Masten started in 2004 in Silicon Valley
- Moved to Mojave in 2006
- Won the Northrop Grumman Lunar Lander Challenge in 2009
  - Total of $1.15M in prize winnings
- Builds reusable VTVL rockets and flies those rockets often

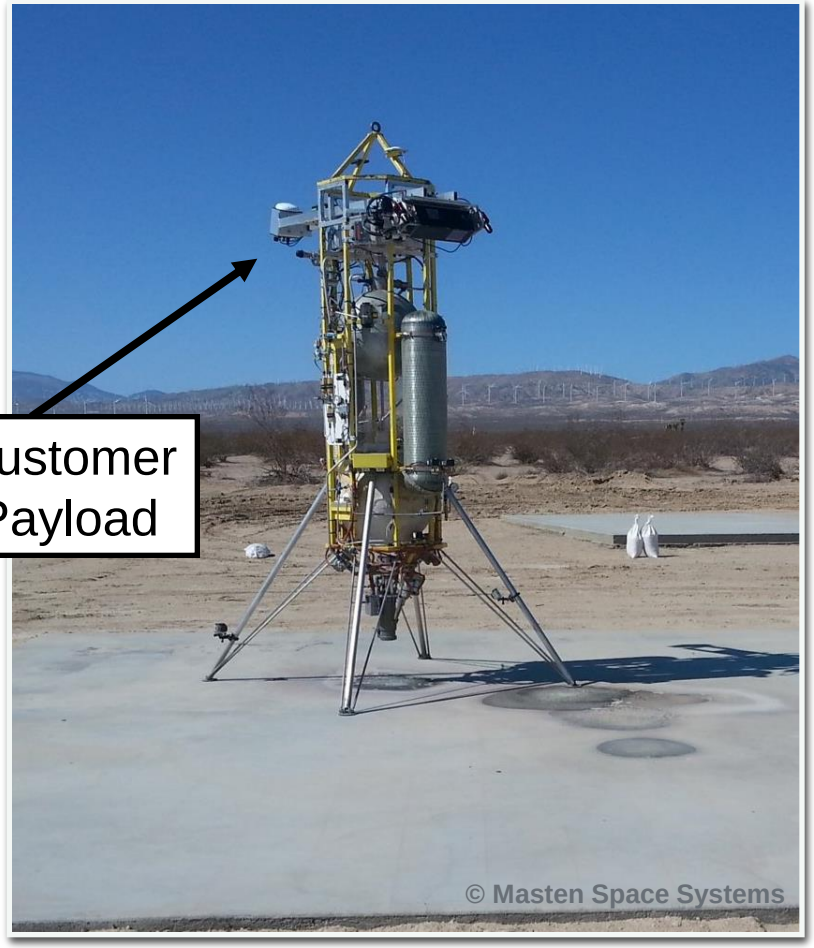
Rocket Flight Count

	Flight Count
Xombie	198
Xoie	12
Xaero	115
Xaero-B	4
TOTAL	**329**

Entry, Descent & Landing

Masten has flown payloads for:

- JPL
- Charles Stark Draper Laboratory
- Astrobotic Technology

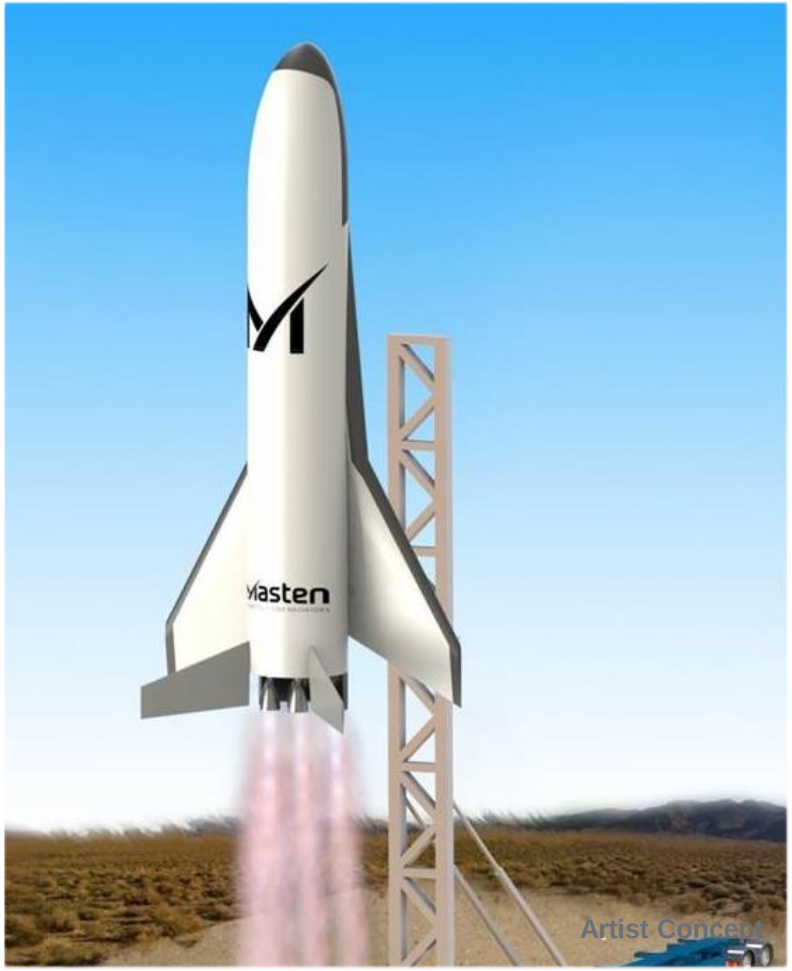


Xaero-B

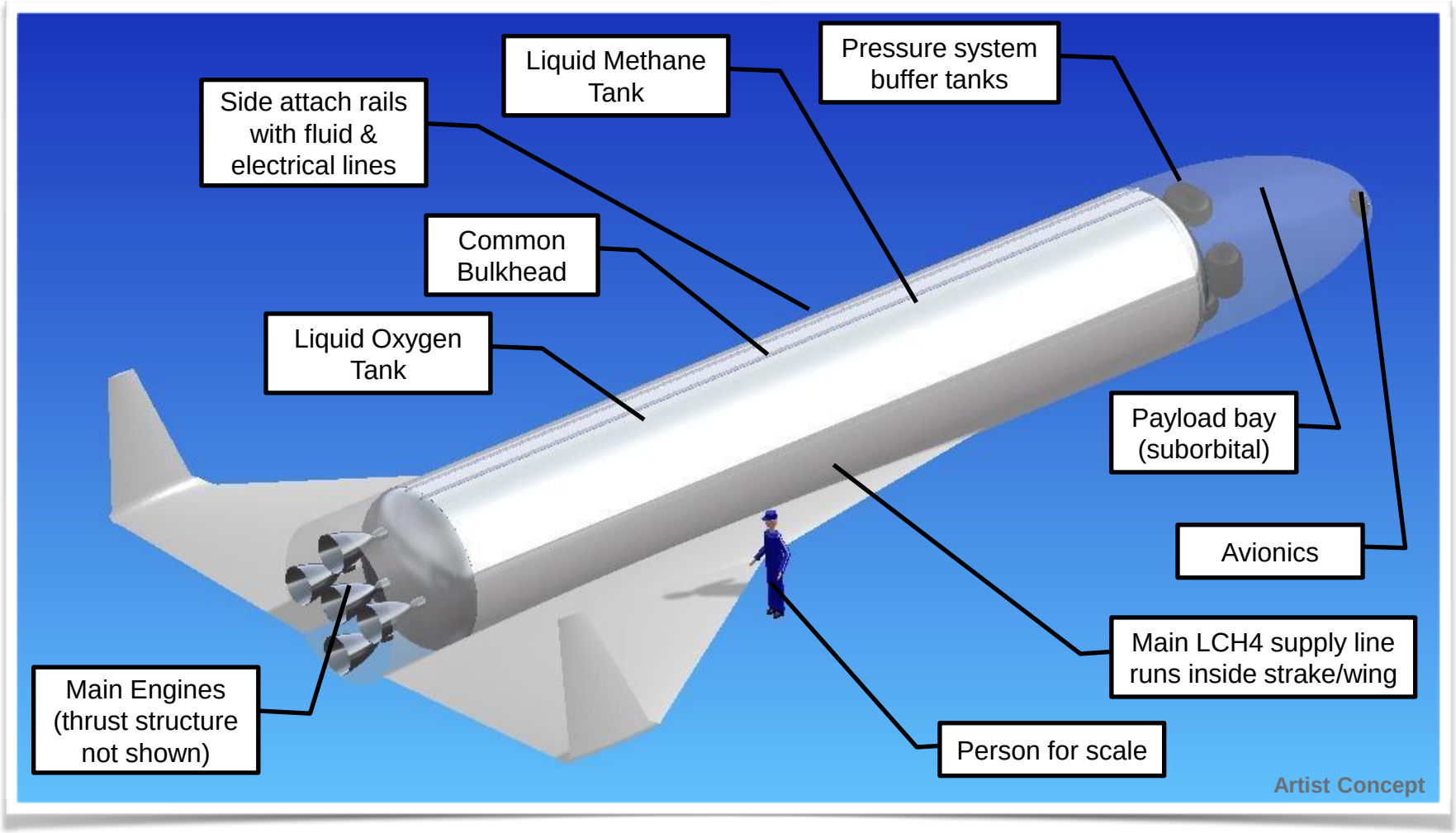
- Xaero-B rocket testing continues
- First four flights completed

DARPA XS-1 Program

- Experimental Spaceplane (XS-1) program goals
  - Reusable first stage
  - Able to fly 10 times in 10 days
  - Reach Mach 10
  - Requires aircraft-like ops
  - 3klb to 5klb to orbit @ $5M/Flt
- Phase 1 Contract
  - Conceptual Design
  - System Requirements
  - Preliminary Design



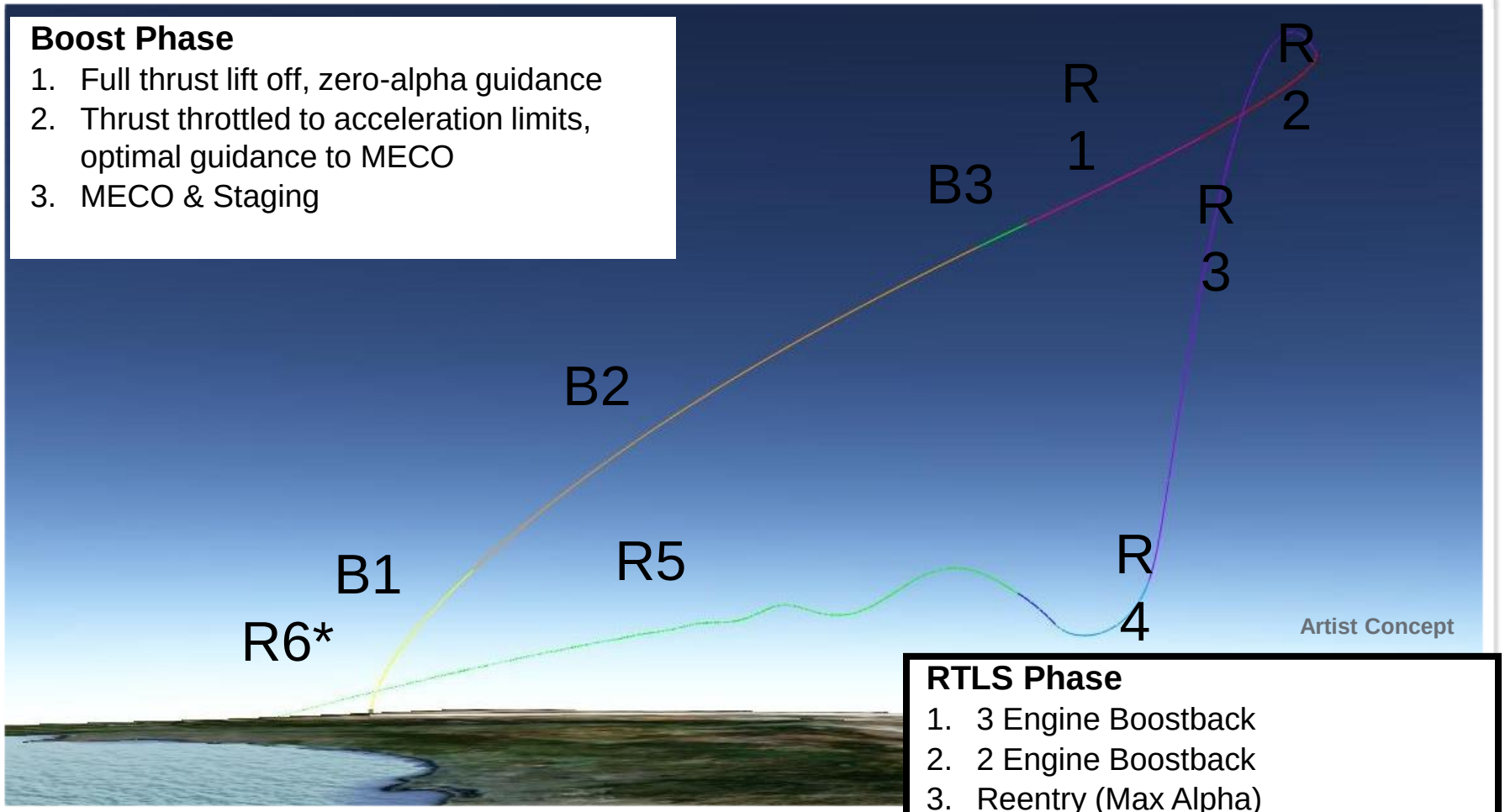
Boost Stage Initial Concept



Proposed Boost & RTLS Trajectory

Boost Phase

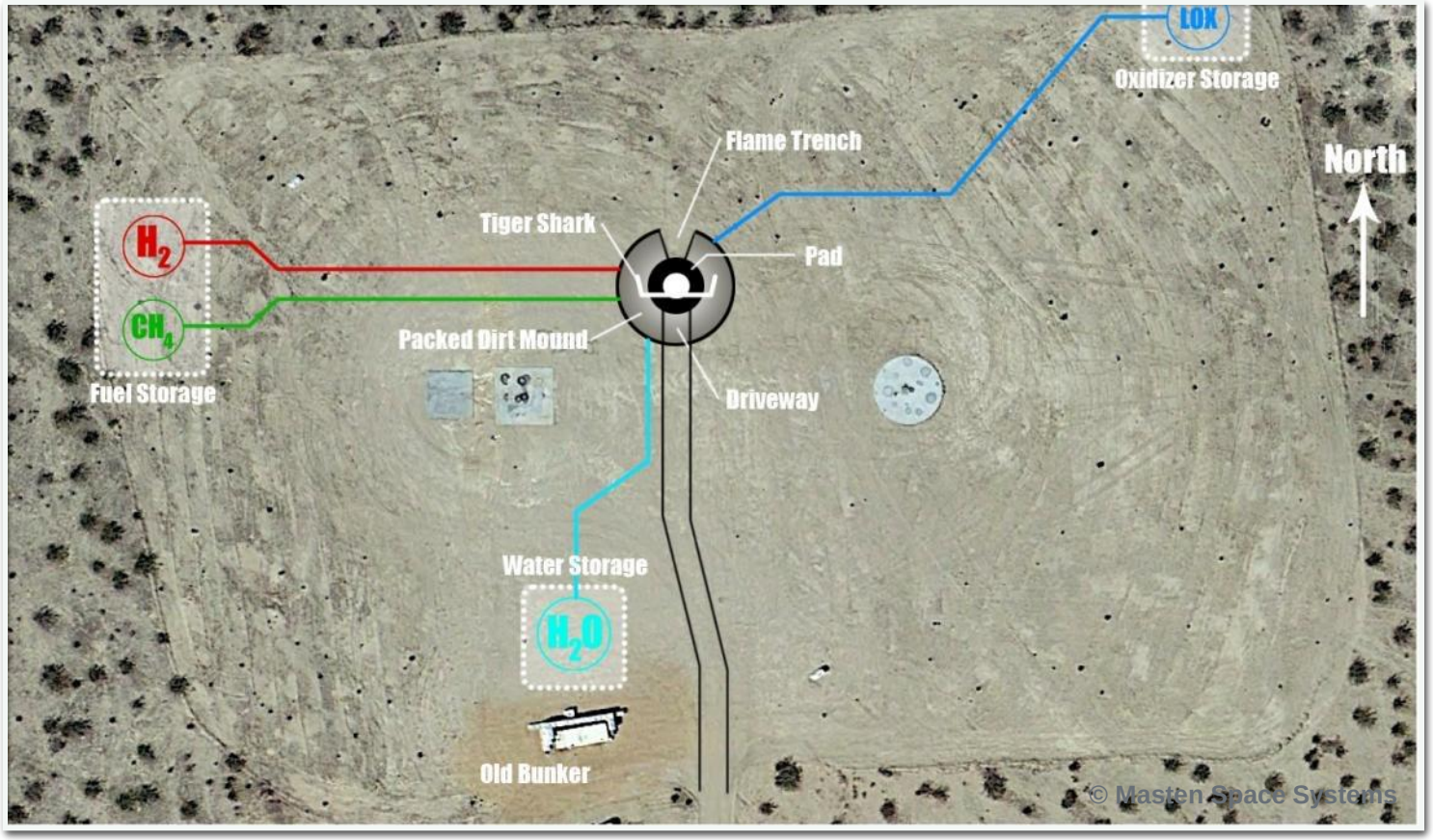
1. Full thrust lift off, zero-alpha guidance
2. Thrust throttled to acceleration limits, optimal guidance to MECO
3. MECO & Staging



RTLS Phase

1. 3 Engine Boostback
2. 2 Engine Boostback
3. Reentry (Max Alpha)
4. Pullout
5. Glide back
6. Approach and Landing* (not shown)

XS-1 CONOPS
Notional Launch Site Layout



- Actual distances to be determined based on further safety analysis and sizing of bulk storage tanks

Questions?